



U.S. Department of Energy

Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-ESQ-0230

04-WTP-240

OCT 22 2004

Mr. J. P. Henschel, Project Director
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 – APPROVAL OF AUTHORIZATION BASIS
AMENDMENT REQUEST (ABAR) 24590-WTP-SE-ENS-04-079, REVISION 0, "ADDITION
OF A NEW CONTROL STRATEGY DUE TO PT INTERNAL FLOODING (@ EL. 38 FT.)
EVENT INTO THE PTF PSAR AS REPRESENTED BY THE PTF SED"

Reference: BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for
Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-04-
079, Revision 0, Addition of a New Control Strategy Due to PT Internal Flooding
(@ EL. 28 Ft.) Event into the PTF PSAR as Represented by the PTF SED," CCN:
090794, dated July 1, 2004.

This letter approves ABAR 24590-WTP-SE-ENS-04-079, Revision 0, submitted to the
U.S. Department of Energy, Office of River Protection (ORP) by Bechtel National, Inc. (BNI)
(Reference). The attached Safety Evaluation Report (SER) approves changes involving the
introduction of a new control strategy for the internal flooding event in the Pretreatment (PT)
facility, due to a Fire Protection Water (FPW) line break (guillotine break). This ABAR and
flooding analysis is applicable only to structural impacts to the 28' elevation of the facility. The
new control strategy proposed in the ABAR consists of an air gap (1.1 inches minimum) around
the transfer tube in the floor of the Room P-0223 on the 28' elevation of the PT facility that
allows water to drain out of the room in the event of an FPW line break.

ORP's review of the changes proposed in the subject ABAR and of the changes to the
Preliminary Safety Analysis Report (PSAR), Revision 1, is summarized in the attached SER.
Based upon the information in the Reference letter and the attached SER, the changes are
acceptable with minor modification and there is reasonable assurance that the health and safety of
the public, the workers, and the environment will not be adversely affected by those changes, and
that they comply with applicable laws, regulations, and River Protection Project Waste Treatment
and Immobilization Plant (WTP) contractual requirements.

The attached SER provides final approval for the facility design changes as described in the
ABAR, but only interim approval of the proposed specific changes to the PT PSAR. Final
approval of the specific PT PSAR page changes will occur when the revised PSAR is submitted
for the next biennial update. This amendment is effective immediately and shall be fully
implemented within 30 days.

Mr. J. P. Henschel
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The current Construction Authorization Agreement (ORP/OSR-2003-01), Revision 2, Section 4.1, Item 1, requires the performance of an evaluation of PT internal flooding as part of the common-cause/common-mode failure analysis, and to identify control strategies for internal flooding events, as necessary, to prevent unacceptable damage to Important to Safety (ITS) structures, systems, and components (SSC). This ABAR addresses this issue for structural impact on the 28' elevation of the PT facility, but does not address structural impacts on other elevations or impacts to non-structural ITS SSCs. Accordingly, this issue remains open.

If you have any questions, please contact me, or your staff may contact Dr. Walter J. Pasciak, WTP Safety Authorization Basis Team, (509) 373-9189.

Sincerely,



Roy J. Schepers
Manager

WTP:WJP

Attachment

cc w/attach:
M. T. Sautman, DNFSB
J. M. Eller, PAC

**Safety Evaluation Report (SER)
of Proposed Authorization Basis Amendment Request (ABAR)
24590-WTP-SE-ENS-04-079, Rev. 0
Preliminary Safety Analysis Report (PSAR)
for the River Protection Project Waste Treatment and Immobilization Plant (WTP)
Pretreatment Facility (PT)**

1.0 INTRODUCTION

This SER documents the U.S. Department of Energy (DOE), Office of River Protection (ORP) evaluation of changes proposed by Bechtel National, Inc. (the Contractor) involving the introduction of a new control strategy for the internal flooding event in the PT facility, due to a Fire Protection Water (FPW) line break (guillotine break). This ABAR and flooding analysis is applicable only to structural impacts to the 28' elevation of the facility. The new control strategy proposed in the ABAR consists of an air gap (1.1 inches minimum) around the transfer tube in the floor of the Room P-0223 on the 28' elevation of the PT facility that allows water to drain out of the room in the event of a FPW line break.

The assessment of the vulnerability to flooding from internal sources to preclude unacceptable structural impacts, constitute the creation of a new hazard for internal flooding. Safety Evaluation Report ORP/OSR-2003-01, Rev.2, Section 4.1, Item 1, requires the performance of an evaluation of PT internal flooding as part of the common- cause/common-mode failure analysis, and to identify control strategies for internal flooding events, as necessary, to prevent unacceptable damage to ITS SSCs. This ABAR addresses this issue for structural impact on the 28' elevation, but does not address structural impacts on other elevations or impacts to non-structural ITS SSCs.

2.0 BACKGROUND

The WTP authorization basis is the composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which ORP grants permission to perform regulated activities. The authorization basis includes that information requested by the Contractor for inclusion in the authorization basis and subsequently accepted by ORP. The PSAR describes the analyzed safety basis for the facility, demonstrates that the facility will perform and be operated such that the radiological, nuclear, and process safety requirements are met, and demonstrates adequate protection of the public, workers, and the environment.

The PSAR is based on the preliminary design of the facilities and is part of the authorization basis for WTP construction. ORP authorized construction¹ of the PT facility based on the facility

¹ ORP letter from R. J. Schepens to R. F. Naventi, BNI, "U.S. Department of Energy (DOE) Notice to Proceed with Construction Activities," 02-OSR-0517, dated November 13, 2002.

safety basis documented in the PSAR. Under the requirements of RL/REG-97-13, Rev. 10,² the Contractor is required to update the PSAR every two years. The amendment request³ submitted by the Contractor proposes changes to the PSAR that will be incorporated in the PSAR during the next biennial update. This SER documents ORP's evaluation of the facility changes proposed in the reference ABAR, and also evaluates the detailed changes to the PSAR. The enclosed SER provides final approval for the facility design changes as described in the ABAR, but only interim approval of the proposed specific changes to the PT PSAR. Final review and approval of the specific PSAR changes will be made at the time of PSAR update when revisions to Chapter 2 are provided.

3.0 EVALUATION (ACCEPTABLE)

This ABAR and flooding analysis is applicable only to the 28' elevation of the facility and it only address structural impacts and does not address impacts to other ITS SSCs such as electrical systems. The event is a Fire Protection Water (FPW) line break (guillotine break). The new control strategy proposed in the ABAR consists of requiring an air gap (1.1 inches minimum) around the transfer tube in the floor of Room P-0223 at the 28' elevation that allows water to drain out of the room, thereby to prevent structural damage from the weight of the water.

A guillotine break in Room P-0223, "Spent Filter Drum Handling Area", was determined to be bounding for the zones listed in the table because of its relatively small floor area and limited number of drain paths from the room. The flooding calculation, 24590-PTF-UOC-10-00002, "Flooding Evaluation for the PTF"⁴, determined that all the drain paths for the other rooms located on the 28' elevation were sufficient to handle flooding from a guillotine line break.

The decision to design a 1.1 inch air gap around the transfer tube in the floor of Room P-0223 is documented in CCN 084372⁵ and is supported by Calculation No. 24590-PTF-UOC-10-00002. This calculation identified that one control strategy is required to mitigate the consequences of an internal flooding event at the 28' elevation of the PT building. This new control strategy is added in order to prevent unacceptable structural damage as a result of flooding. Note that it is the weight of the buildup of water that was determined to potentially impact the facility.

This change is acceptable because the ORP reviewers agreed with the Contractor's determination that a flooding event in Room P-0223 bounds the structural impact for the 28' elevation. The ORP reviewers also agreed with the Contractor's calculation that a 1.1 inch space around the transfer tube in this room will provide adequate drainage to prevent structural damage.

² Office of River Protection Position on Contractor-Initiated Changes to the Authorization Basis, RL/REG-97-13, Revision 10, Department of Energy, December 2003.

³ BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-04-079, Revision 0, "Addition of a New Control Strategy Due to PT Internal Flooding (@ El. 28 Ft.) Event into the PTF PSAR as Represented by the PTF SED" CCN: 090794, dated July 1, 2004.

⁴ Calculation No. 24590-PTF-UOC-10-00002, "Flooding Evaluation for the Pretreatment Facility", dated April 12, 2004.

⁵ Meeting Minutes, "ISM Flooding Concerns for PTF Elevation 28", CCN: 084372 dated March 22, 2004.

3.1 Review of Proposed Changes to PT PSAR

3.1.1 Proposed Addition of New Section 3.5, Hazard Topography”, including subsections, to the PT PSAR::

“3.5 Hazard Topography

3.5.1 Internal Flooding Hazard

3.5.1.1 Introduction

An evaluation of the potential structural impacts from internal flooding was prepared as part of the Integrated Safety Management (ISM) Topography activities. This evaluation assessed the maximum credible internal flooding event for each room or area without mitigation by active systems. The evaluation considered passive design features (e.g., drains, doors, hatches, etc.).

3.5.1.2 Methodology

The evaluation was performed using the methodologies described in 24590-WTP-RPT-ENS-03-009, *Evaluation of Facility Flooding Hazards*, and in Calculation 24590-PTF-U0C-10-00002, *Flooding Evaluation for the Pretreatment Facility*.

The internal flooding analysis has the following elements:

- Define internal flooding scenarios
- Identify structural loads imposed by the event
- Identify potential consequences from the loads imposed by the flooding event

3.5.1.3 Fluid Systems Analyzed

The internal flooding hazard evaluation addressed failures in the non-hazardous fluid systems. The flooding hazard evaluation addressed the following systems:

- Fire Water System (FPW)
- Plant Cooling Water System (PCW)
- Chilled Water System (CHW)
- Demineralized Water System (DIW)
- Plant Service Water System (PSW)
- Domestic Water System (DOW)

3.5.1.4 Results

The PT building elevation 28 feet floor was evaluated and all results were acceptable with the exception of Room P-0223. Room P-0223, Spent filter drum handling area, was determined to be vulnerable to internal flooding (refer to Calculation 24590-PTF-U0C-10-00002).

In this room, the only normally charged water line is a 4" FPW line. There are two, 6" PWD drains in the room. The postulated flow rate from a break in the line was 4300 gpm. For these conditions, water accumulation due to a guillotine break could cause structural damage to the room floor.

3.5.1.5 Control Strategy

The control strategy consists of maintaining floor drains and an air gap (1.1 inches minimum) in an existing waste drum transfer tube (TRAN TUBE 1) open, in the floor of PT room P-0223. To facilitate drainage, the TRAN TUBE 1 is credited with an air gap of 1.1". With these control strategies factored in the analysis, the water level does not reach a height exceeding the floor live load limit for the room.

A foreign materials control program will be established as required by DOE Order 5480.19. This program will ensure the floor drains and the air gap around the transfer tube are not plugged with foreign material. In addition, in a seismic event where equipment becomes dislodged, the likelihood of plugging the air gap is small because of its geometry. Also, the Contractor will take measure to ensure that equipment dislodged in a seismic event will not plug the floor drains. These measures may consist of installing cone-shaped screens over the floor drains."

ORP reviewers added underlined text to the last paragraph to address the likelihood of the floor drains or air gap being plugged as a result of foreign material or items being dislodged in a seismic event.

Evaluation (acceptable, as modified): The change is acceptable because it is consistent with the proposed design change evaluated in Section 3.0 above.

3.1.2 Continued Proposed Changes to PT PSAR, Section 5.6.19, "Hazard Topography: Internal Flooding":

"Hazard Topography: Internal Flooding

Design Features for the Internal Flooding at Elevation 28 ft include the following:

- An air gap of 1.1 inches minimum in an existing Transfer Tube 1, in the floor of room P-0223, is credited as a water drain in a flooding event scenario.

- The floor drain system in C2/C3 must provide an unobstructed pathway for liquid releases to flow to -19 ft. drain collection pit.”

ORP reviewers added the underlined word to the above bullet for clarity.

Evaluation (acceptable, as modified): The change is acceptable because it is consistent with the proposed design change evaluated in Section 3.0 above.

5.0 CONCLUSIONS

On the basis of the considerations described above, the ORP has concluded there is reasonable assurance that the health and safety of the public, the workers and the environment will not be adversely affected by the changes proposed by ABAR 24590-WTP-SE-ENS-04-079, Revision 0. The proposed changes do not constitute a significant reduction in commitment or effectiveness relative to the design, construction, and operation of ITS SSCs. Accordingly, the proposed changes are acceptable and the ORP approves the general design change and interim-approves the specific PSAR changes as proposed in 24590-WTP-SE-ENS-04-079, Revision 0.

Safety Evaluation Report ORP/OSR-2003-01, Rev. 2, Section 4.1, Item 1, requires the performance of an evaluation of PT internal flooding as part of the common- cause/common-mode failure analysis, and to identify control strategies for internal flooding events, as necessary, to prevent unacceptable damage to ITS SSCs. This ABAR addresses this issue for structural impact on the 28' elevation of the PT facility, but does not address structural impacts on other elevations or impacts to non-structural ITS SSCs. Accordingly, this issue remains open.